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Quinn, J., & McGahon, M. (2018). A widening participation and outreach pilot project. *Queens University Belfast Reflections* , (26), 5.

Published in:
Queens University Belfast Reflections

Document Version:
Publisher's PDF, also known as Version of record

Queen's University Belfast - Research Portal:
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Download date:05. May. 2023

A Widening Participation and Outreach Pilot Project

By Dr Joe Quinn & Dr Mary McGahon, Centre for Biomedical Sciences Education

In June 2007, the Department of Education and the Department of Employment and Learning in Northern Ireland commissioned a Review of Science, Technology, Engineering and Mathematics (STEM). It was recognised that young people are increasingly disengaged from STEM which manifests itself in reducing enrolments in courses focused on STEM subjects (1). A subsequent report published in 2009 recommended that there should be engagement between stakeholders, schools, FE colleges, universities and government to 'focus on growing the STEM artery across the education service and the promotion of STEM within our society'. It also concludes that although there is a strong STEM pool at GCSE within the non-selective sector, this is not continuing with these young people through to A-level, and consequently they are leaving the 'STEM artery' post 16 (2).

In Northern Ireland, grammar schools account for one-third of all secondary schools. Evidence suggests that children from higher socio-economic groups have a much greater chance of gaining entry to a grammar school. At Queen's University Belfast as a whole, undergraduate students from the lowest household income category represent 29% of the student population. However, these statistics do not differentiate whether these student attended grammar or non-selective post primary schools or subject studied. In 2017, Queen's gave 200 conditional offers to students from Northern Ireland applying to enter the Human Biology or Biomedical Sciences Undergraduate degree pathways.

Of these 200 offers, 83.5% were to students from grammar schools, whilst 11.5 % were to those in FE and only 5% to those attending secondary schools. These figures would seem to suggest that within this STEM based degree pathway, secondary school pupils are substantially under-represented, and that a need exists to increase engagement with the demographic early in their progression through secondary education.

Through our membership and close alliances with The Physiological Society of Great Britain and Ireland, we became aware of their initiative to promote wider awareness of physiology in higher education and decided to host a 'Physiology Friday' event. This event which was scheduled to fall on the last Friday of Biology Week and was promoted by Royal Society of Biology to 'showcase the important and amazing world of the biosciences', aimed to get everyone from children to professional biologists involved in fun and interesting life science activities' (https://www.rsb.org.uk/get-involved/biologyweek).

Based on the research outlined above, and our links to the Physiological Society, we proposed hosting a 'hands-on' day for students and teachers from secondary schools from areas that scored high on the Northern Ireland Multiple Deprivation Measure 2010. Participants were invited to the Centre for Biomedical Sciences (Education) (CBMSE) to take part in a hands on event designed to spark interest in STEM and dispel some of the myths around academia and the pursuit of 3rd level education.

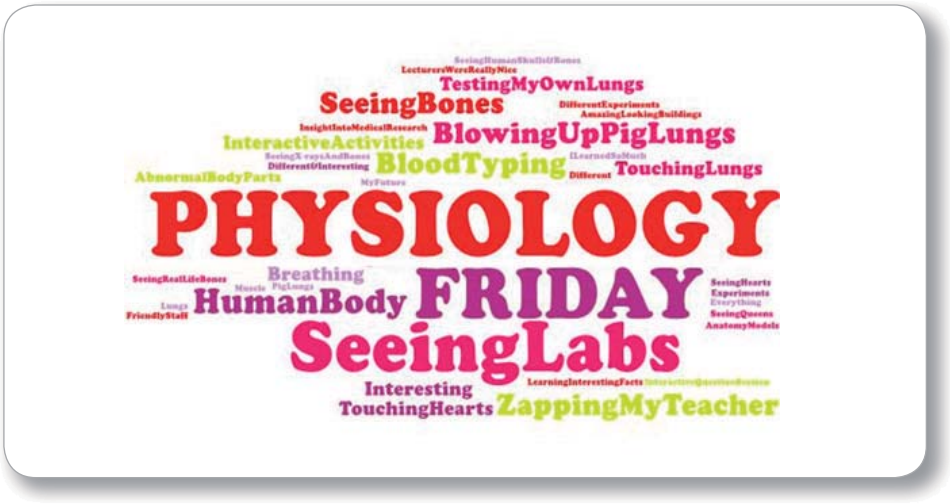
The project aspired to make pupils aware of biomedical science and human biology related careers and courses before students choose their GSCE subjects, helping them make a more

informed decision about what subjects they may need to choose (GCSE biology and/or chemistry) and to enthuse them to consider a biomedical science/human biology-related degree in the future, thus widening access and participation. It was also hoped to make links with teachers in these schools so that they are in a position to encourage the subjects relevant to biomedical sciences and human biology and to promote these disciplines as potential subjects to pursue in higher education. As students from non-selective secondary schools in Northern Ireland seem to be under-represented in undergraduate Biomedical Sciences and Human Biology courses at Queen's, the goal of this pilot project was to target this demographic to inspire and inform pupils around STEM subjects prior to GSCE selection.

To facilitate this STEM activity, we applied to the Physiological Society's Physiology Friday fund and received £500 for consumables and transport costs and invited pupils and staff from 3 Northern Ireland secondary schools each bringing 10-15 students and a total of 4 members of staff. Twelve members of the CBMSE staff participated 'hands on' (with many others working in the background) and delivered an exciting day of interaction and exploration in which the pupils could explore body structure and function, explore careers in biomedical and human biology related areas, and become aware of the spread of career aspirations, academic background and career paths of CBMSE staff.

The students and accompanying teachers enthusiastically engaged with the range of interactive tasks provided which included:

- Breaking down the barriers to academia – interactive 'Who wants to be a millionaire' style presentation illustrating how the academic staff of CBMSE are made up of many individuals who didn't attend grammar school, pass the transfer test, pass all their GSCEs or know what career they wanted at 13-14 years old.
- Tour of the Centre for Experimental Medicine – a working Medical Research laboratory with discussion of how medical research being carried out by students in QUB is changing patient lives.
- Determining an unknown blood group – a concept they may be aware of from TV programmes such as CSI but would not be covered in their education thus far.
- Measuring lung function – a test they were able to perform on themselves to assess how large their lungs are and how this varies with subject height and athleticism.
- Measuring nerve conductance with EMG software – pupils were able to administer a small electrical shock to their teachers arm and see the response both in terms of the arm moving and in electrical activity on the computer.
- Examining micrographs, bones, anatomical specimens and x-rays – giving pupils insight into the microscopic and internal worlds of the body.
- Confidence building Question and Answer session.



Feedback from the school staff was very encouraging and appreciative of the efforts made and opportunities given by the open day. All schools involved expressed a wish to be included in any further events while the pupils themselves were also very enthused. Of the 43 attendees, 11 indicated that prior to the visit they hadn't either considered university or weren't interested, and all but 2 were now considering it and one 'wasn't sure'. Of those who had previously aspired to go university in the future, many said that "If anything it has made me want to go to university even more". Pupils' favourite activities are condensed into the word cloud below and it was clear that they enjoyed the event immensely and gained a 'hands on' experience which is likely to provide much inspiration for their future studies.

Special thanks goes to Dr Eva Sweeney, Ms Alexandra Mawhinney, Dr Etain Tansey, Dr Sean Roe, Dr Laura Montgomery, Dr Declan McLaughlin, Dr Claire Foy, Dr Nuala Tipping, Mrs Patricia McClean and Mrs Agata Socha who facilitated 'hands on' experiences, the CBMSE academics who revealed their career aspirations at age 13 and academic failures along the way to success, and the CBMSE administration and technical teams who ensured everything ran smoothly. Many thanks to the schools involved: Girls Model Belfast, St Mary's Clady & St Paul's Kilrea, and the teachers who allowed themselves to be zapped. Finally, many thanks to the Physiological Society who provided inspiration and financial support.

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(1) Research and Information Service Briefing Paper – Science, Technology, Engineering and Mathematics (STEM) http://www.niassembly.gov.uk/globalassets/documents/raise/publications/2012/education/6212.pdf

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